IN THE CLAIMS:

1. (Original) A method of epitaxially growing a multi-layer device in a single epitaxial run utilizing HVPE techniques, the method comprising the steps of:

locating a first Group III source within an HVPE reactor;

locating a second Group III source within said HVPE reactor;

heating said first Group III source to a first temperature;

heating said second Group III source to a second temperature;

heating a first growth zone of said HVPE reactor to a third temperature;

heating a second growth zone of said HVPE reactor to a fourth temperature, wherein said first and second growth zones are different growth zones;

locating a substrate within said first growth zone;

reacting said first Group III source with a halide gas to form a first Group III reactant;

reacting said second Group III source with said halide gas to form a second Group III reactant;

transporting said first Group III reactant to said first growth zone;

transporting a reaction gas to said first growth zone, said reaction gas containing nitrogen;

reacting said first Group III reactant with said reaction gas to grow a first Group III nitride layer of a first thickness on said substrate;

transferring said substrate to said second growth zone, wherein a temperature corresponding to said substrate varies by less than 200° C during the transferring step;

transporting said second Group III reactant to said second growth zone;

transporting said reaction gas to said second growth zone; and

reacting said second Group III reactant with said reaction gas to grow a second Group III nitride layer of a second thickness on said first Group III nitride layer substrate.

2. (Original) The method of claim 1, further comprising the step of transferring said substrate to a growth interruption zone maintained at a fifth temperature prior to the step of transferring said substrate to said second growth zone.

3. (Original) The method of claim 2, further comprising the step of directing an inert gas in a flow direction that substantially prevents said first Group III reactant, said second Group III reactant, and said reaction gas from entering said growth interruption zone.

4. (Original) The method of claim 1, further comprising the step of stabilizing the reaction between said second Group III reactant and said reaction gas prior to performing said step of transferring said substrate from said first growth zone to said second growth zone.

5. (Original) The method of claim 2, further comprising the step of stabilizing the reaction between said second Group III reactant and said reaction gas prior to transferring said substrate from said growth interruption zone to said second growth zone.

6. (Original) The method of claim 1, wherein the temperature corresponding to said substrate varies by less than 100° C during the transferring step.

7. (Original) The method of claim 1, wherein the temperature corresponding to said substrate varies by less than 50° C during the transferring step.

8. (Original) The method of claim 1, wherein the temperature corresponding to said substrate varies by less than 10° C during the transferring step.

9. (Original) The method of claim 1, wherein the first thickness of said first Group III nitride layer is greater than 1 micron and the second thickness of said second Group III nitride layer is less than 1 micron.

10. (Original) The method of claim 1, wherein the first thickness of said first Group III nitride layer is greater than 2 microns and the second thickness of said second Group III nitride layer is less than 1 micron.

11. (Original) The method of claim 1, wherein the first thickness of said first Group III nitride layer is greater than 5 microns and the second thickness of said second Group III nitride layer is less than 1 micron.

12. (Original) The method of claim 3, wherein said flow direction of said inert gas is substantially orthogonal to a source flow direction.

13. (Original) The method of claim 3, wherein said flow direction of said inert gas is substantially opposite to a source flow direction.

14. (Original) The method of claim 3, wherein said flow direction of said inert gas is at an oblique angle to a growth surface of said substrate.

15. (Original) The method of claim 1, further comprising the steps of:

locating a third Group III source within said HVPE reactor;

heating said third Group III source to a fifth temperature;

reacting said third Group III source with said halide gas to form a third Group III reactant;

transporting said third Group III reactant to said first growth zone; and

reacting said third Group III reactant with said reaction gas, wherein said first Group III nitride layer is comprised of both said first and third Group III sources.

16. (Original) The method of claim 15, further comprising the steps of:

locating a fourth Group III source within said HVPE reactor;

heating said fourth Group III source to a sixth temperature;

reacting said fourth Group III source with said halide gas to form a fourth Group III reactant;

transporting said fourth Group III reactant to said first growth zone; and

reacting said fourth Group III reactant with said reaction gas, wherein said first Group III nitride layer is comprised of said first, third and fourth Group III sources.

17. (Original) The method of claim 1, further comprising the steps of:

locating a third Group III source within said HVPE reactor;

heating said third Group III source to a fifth temperature;

reacting said third Group III source with said halide gas to form a third Group III reactant;

transporting said third Group III reactant to said second growth zone; and

reacting said third Group III reactant with said reaction gas, wherein said second Group III nitride layer is comprised of both said second and third Group III sources.

18. (Original) The method of claim 1, further comprising the steps of:

locating a fourth Group III source within said HVPE reactor;

heating said fourth Group III source to a sixth temperature;

reacting said fourth Group III source with said halide gas to form a fourth Group III reactant;

transporting said fourth Group III reactant to said second growth zone; and

reacting said fourth Group III reactant with said reaction gas, wherein said second Group III nitride layer is comprised of said second, third and fourth Group III sources.

19. (Original) The method of claim 1, further comprising the step of growing a buffer layer on said substrate prior to said step of reacting said first Group III reactant with said reaction gas to grow a first Group III nitride layer.

20. (Original) The method of claim 19, wherein said buffer layer is comprised of a material selected from the group consisting of GaN, AlN, and aluminum oxy nitride.

21. (Original) The method of claim 1, further comprising the steps of:

heating at least one acceptor impurity metal to a fifth temperature; and

transporting said at least one acceptor impurity metal to said first growth zone, wherein said first Group III nitride layer contains said at least one acceptor impurity metal.

22. (Original) The method of claim 21, wherein said first Group III nitride layer is a p-type layer.

23. (Original) The method of claim 21, wherein said at least one acceptor impurity metal is selected from the group consisting of magnesium (Mg), zinc (Zn) and magnesium-zinc (MgZn) alloys.

24. (Original) The method of claim 21, further comprising the step of lowering a temperature corresponding to said at least one acceptor impurity metal from said fifth temperature to a sixth temperature, wherein said lowering step is performed after initiation of growth of said first Group III nitride layer and prior to said step of transferring said substrate to said second growth zone.

25. (Original) The method of claim 24, wherein said sixth temperature is approximately 10° C lower than said fifth temperature.

26. (Original) The method of claim 1, further comprising the steps of:

heating at least one acceptor impurity metal to a fifth temperature; and

transporting said at least one acceptor impurity metal to said second growth zone, wherein said second Group III nitride layer contains said at least one acceptor impurity metal.

27. (Original) The method of claim 26, wherein said second Group III nitride layer is a p-type layer.

28. (Original) The method of claim 26, wherein said at least one acceptor impurity metal is selected from the group consisting of magnesium (Mg), zinc (Zn) and magnesium-zinc (MgZn) alloys.

29. (Original) The method of claim 26, further comprising the step of lowering a temperature corresponding to said at least one acceptor impurity metal from said fifth temperature to a sixth temperature, wherein said lowering step is performed after initiation of growth of said second Group III nitride layer.

30. (Original) The method of claim 29, wherein said sixth temperature is approximately 10° C lower than said fifth temperature.

31. (Original) The method of claim 1, further comprising the step of transporting at least one donor impurity to said first growth zone, wherein said first Group III nitride layer contains said at least one donor impurity.

32. (Original) The method of claim 31, wherein said at least one donor impurity is selected from the group consisting of oxygen (O), germanium (Ge), silicon (Si) and tin (Sn).

33. (Original) The method of claim 1, further comprising the step of transporting at least one donor impurity to said second growth zone, wherein said second Group III nitride layer contains said at least one donor impurity.

34. (Original) The method of claim 33, wherein said at least one donor impurity is selected from the group consisting of oxygen (O), germanium (Ge), silicon (Si) and tin (Sn).